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[U.S.S.R. as it is; a popular illustrated handbook] SSSR kak on est'; populiarnyi illiustrirovannyi spravochnik. Moskva, Gos.izd-vo polit. lit-ry, 1959. 462 p. (MIRA 12:2)

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PETROV, I.R., prof.; ZOR'KIN, A.A., dotsent

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PETROV, I.R.; ZOR!KIN, A.A.

Report on meetings of the Leningrad Society of Pathophysiologists in 1960. Pat.fiziol. i eksp. terap. 5 no.3:92-93 My-Je '61. (MIRA 14:6)

(LENINGRAD—PATHOPHYSIOLOGICAL SOCIETIES)

PETROV, I.P., prof., polkovnik med.sluzhby, GUBLER, Ye.V., dots., podpolkovnik med.sluzhby, ZOR'KIN, A.A., mayor med.sluzhby, KULAGIN, V.K., mayor med.sluzhby

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1. Nachal'nik kafedry patologicheskoy fiziologii Voyenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova, chlen-korrespondent AMN SSSR (for Petrov).
(DANILOV, MIKHAIL GRIGOR'EVICH, 1902-1955)

ZOR'KIN, A.A.

DANILOV, M.K.; ZOR'KIN, A.A.; GUBLER, Ye.V.; KULAGIN, V.K.

Ioakim Romanovich Petrov; 60th birthday. Arkh.pat. 16 no.1:92-93 Ja-Mr '54. (MLRA 7:5)
(Petrov, Ioakim Romanovich, 1893- )

ZOR'KIN, A.A., doktor med. nauk, otv. red.; SHOYMER, A., red.

[Reports of the 22d Regular Scientific Session of the Kishinev Medical Institute on the Results of Scientific Research Work for 1963] Doklady 22-i ocherednoi nauchnoi sessii Kishinevskogo meditsinskogo instituta po itogam Nauchno-issledovatel'skoy raboty za 1963 god. Kishinev, Kartia moldoveniaske, 1964. 251 p. (MIRA 18:3)

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ZOR'KIN, A.A.

USSR/Medicine - Physiology FD-935

Card 1/1 Pub 33-18/29

Author : Petrov, I. P. and Zor'kin, A. A.

Title : New methods of examining depressor reflex from baroreceptors of sino-carotid zone

Periodical : Fiziol. zhur. 40, 357-358, May/Jun 1954

Abstract : Ye. A. Moyseyev's method of determining depressor reflex from baroreceptors of sino-carotid zone has many defects. The improved method proposed by the author of this article makes use of vascular obturator to increase pressure in the sino-carotid zone. Experiments conducted on dogs proved superiority of this method over Ye. A. Moyseyev's method. The new method may also be used in exciting baroreceptors of other vessels. Diagrams. Table.

Institution : Chair of Pathological Physiology, Military Medical Academy imeni S. M. Kirov

Submitted : April 6, 1953

PETROV, I.R., prof. (Leningrad, ul. Lebedova, d.10-a, kv.18); ZOR'KIN, A.A., dotsent

Use of hypothermia of the head in preventing sequelae of total cerebral anemia. Vest. khir. no.12:34-39 '62. (MIRA 17:11)

1. Iz kafedry patologicheskoy fiziologii (nachal'nik - prof. I.R. Petrov) Voyennomeditsinskoy ordena Lenina akademii imeni Kirova. 2. Deystvitel'nyy chlen AMN SSSR (for Petrov).

ZOR'KIN, A.A., doktor med. nauk, otv. red.; SHCHERB, A., red.

[Reports of the 22d Regular Scientific Session of the Kishinev Medical Institute on the results of scientific Session of the Kishinev Medical Institute on the results of scientific research work in 1963; dedicated to the 40th anniversary of the establishment of the Moldavian S.S.R. and founding of the Communist Party of Moldavia] Doklady 22-i ocherednoi nauchnoi sessii Kishinevskogo meditsinskogo instituta po itogam nauchno-issledovatel'skoi raboty za 1963 god; posviashchaetsia 40-letiiu obrazovaniia Moldavskoi SSR i sozdaniia Kommunisticheskoi partii Moldavii. Kishinev, Kartia moldoveniaske, 1964. 251 p. (MIRA 18:5)

1. Kishinev. Gosudarstvennyy meditsinskiy institut.

23727

S/057/61/031/006/011/019
B116/B203

9,1300

AUTHORS: Dmitriyev, V. M., Zorkin, A. F., Lyapunov, N. V., and Sedykh, V. M.

TITLE: Approximation method for calculating the eigenfrequencies of irregular limit resonators

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 712-716

TEXT: The approximation method described in the present paper is based on the use of the cross-section method, and yields rather simple and sufficiently accurate formulas for determining the resonance wavelengths of irregular limit resonators. First, the problem is formulated and a general solution is given. The authors consider a section of a tapered irregular waveguide (Fig. 1) made of an ideally conducting metal. The other end of the waveguide is assumed to be closed with a stopper; the waveguide is excited at that end. At certain frequencies, such a device will behave like a resonator. The relation between the resonance wavelengths of such a resonator and its dimensions is to be determined. The cross-section method developed by B. Z. Katsenelenbaum (Ref. 3: DAN SSSR,

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102, no. 4, 1955) is used for the calculation. The authors study an element lying between the planes $S_1$ and $S_2$ and the lateral resonator surface, assuming that the lateral surface only slightly differs from a cylindrical one. Then, $dz/dt = v_{Ph}(z)$ (1) holds with sufficient accuracy, where $v_{Ph}(z) = v_0 / \sqrt{1 - [\lambda_0/\lambda_c(z)]^2}$ is the phase velocity of the wave in the cylindrical waveguide; $\lambda_c(z)$ is the critical wavelength of the cylindrical waveguide; and $\lambda_0$ is the wavelength in the free space. After separating the variables, (1) is transformed:

$$\int_0^{p\frac{T}{2}} dt = \int_0^{p\frac{\lambda_d}{2}} \frac{1}{v_0}\sqrt{1-\left[\frac{\lambda_0}{\lambda_c(z)}\right]^2}\,dz. \quad (2)$$

where $\lambda_d$ is the wavelength in an irregular limit waveguide, T is the oscillation period, p = 1, 2, 3, ... It is assumed that the critical cross section totally reflects the electromagnetic waves like a metal wall.

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In this case, the resonance condition reads: $\lambda_0 = \lambda_p = \lambda_c(z)\big|_{z = \frac{\lambda_0}{2}}$ (3), $\lambda_p = \lambda_r$ is the resonance wavelength of an irregular limit resonator. If $\lambda_c(z)$ is known, the resonance wavelengths can be determined from (2) and (3). $\lambda_c(z)$ must be determined separately for every resonator shape. Now, the authors study a conical limit resonator of any cross-section shape. With the use of the similarity of the resonator cross sections, they obtain the formula $\frac{p\lambda_c(0)}{2d} = \alpha - \arctan\alpha$ (6), where $\alpha = \sqrt{\left[\frac{\lambda_c(0)}{\lambda_0}\right]^2 - 1}$. If p, $\lambda_c(0)$, and d are known, it is possible to determine $\alpha$, and, therefore, also the resonance wavelength, because $\lambda_p = \lambda_0 = \frac{\lambda_c(0)}{\sqrt{1+\alpha^2}}$. (7), where $\lambda_c(0)$ is the critical wavelength of the cylindrical waveguide of the cross-section S; d is the cone height. With the use of (6) and (7), it is possible to determine the resonance wavelengths of conical resonators of any cross-section shape (H, П, and others) for which the critical

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wavelength is known. Conical resonators of rectangular and round cross section are studied as examples. For the former case,

$$\frac{abp}{d\sqrt{(mb)^2 + (na)^2}} = \alpha - \arctan\alpha \quad (8)$$ and

$$\lambda_r = \frac{2ab}{\sqrt{(mb)^2 + (na)^2}\sqrt{1 + \alpha^2}} \quad (9)$$ are written down instead of (6) and (7). For the latter case, $\frac{\pi p \tan\theta}{u_{mn}} = \alpha - \arctan\alpha$ (10) and

$$\lambda_r = \frac{2\pi a}{u_{mn}\sqrt{1 + \alpha^2}} \quad (11)$$ are written down for E waves, and

$$\frac{p\pi \tan\theta}{u'_{mn}} = \alpha - \arctan\alpha \quad (12)$$ and $$\lambda_r = \frac{2\pi a}{u'_{mn}\sqrt{1 + \alpha^2}} \quad (13)$$ for H waves,

where $u_{mn}$ are the roots of the Bessel function and $u'_{mn}$ are the roots of the derivative of the Bessel function. To check the formulas obtained, the authors determined the resonance wavelengths of rectangular, irregular

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limit resonators by experiment. They examined two resonators with $a = 20$ mm, $a_1 = 16.6$ mm, $d_1 = 280$ mm, $a = 23$ mm, $a_1 = 17$ mm, and $d_1 = 120$ mm, respectively, where the narrow cross section was unchanged over the length and equal to $b = 10$ mm. The resonators were excited by the $H_{10}$ wave. Since $\lambda_c$ does not depend on b in this case, formulas (8) and (9) could be checked with these resonators. Measurements were made by the "sucking-off" method in the three-centimeter band. The experimental test showed that the formulas obtained are usable for the practical calculation of conical limit resonators. There are 4 figures, 3 tables, and 5 Soviet-bloc references.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A.M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: July 27, 1960

Card 5/6

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77303
SOV/57-30-2-5/18

AUTHORS: Sedykh, V. M., Zorkin, A. F.

TITLE: Propagation of a Quasi-Circular Electrical Wave in a Cross-Shaped Waveguide

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 2, pp pp 159-164 (USSR)

ABSTRACT: Previously Sedykh (Patent Nr 108430 and Issledovaniye krestoobraznogo volnovoda, Uch. zap. KhGU, Trudy radiofizicheskogo fakyl'teta, 4, 1959) investigated waveguides with a cross-shaped cross section (Fig. 1) and discovered that such waveguides have values of parameters which are intermediate between those of rectangular and circular waveguides. The authors expected that the quasi-circular wave existing in such a waveguide can be considered to be a $H_{01}$ wave of the circular waveguide transformed by means of a smooth transition from the circular to the cross-shaped

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cross section. They hoped that such a quasi-circular wave would have negligible losses and would be free from the $E_{11}$ satellite existing in the circular waveguide.

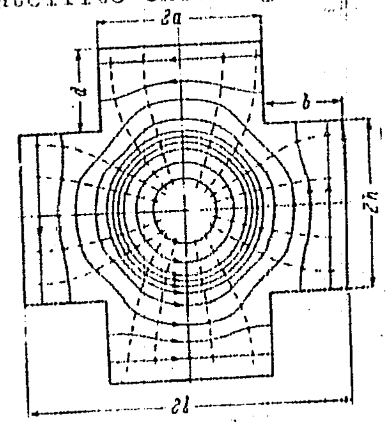


Fig. 1

During calculations the authors worked with a symmetrical configuration ($a = b = d = h$) since in this case the quasi-circular wave configuration was

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closest to a circular one. To find the critical frequency $f_c$ they needed to evaluate the waveguide eigenvalue $\varkappa$ :

$$\varkappa = \frac{2\pi f_c}{c} = \frac{2\pi}{\lambda_c},$$

where $\lambda_c$ = critical wavelength of the wave. At this point they noted that instead of solving equations for the cross section on Fig. 1, one can use the much simpler geometry shown on Fig. 2.

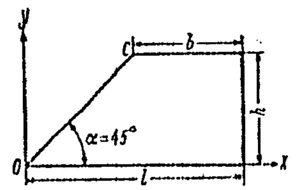


Fig. 2.

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This simpler waveguide form was already solved by Molov and Funtova (Kriticheskiye chastoty ochen' nizkih volnovodov trapetsiyevidnogo secheniya, Uch. zap. MGPI im Lenina, 101, 1957; Kriticheskiye chastoty volnovoda s secheniyem v vide pryamougol'noy trapetsii, Uch. zap. MGPI im. Lenina, 101, 1957), and the authors used their Eq. (3) to get the critical frequency:

$$(\cos a\varkappa - \cos 2a\varkappa)\left([\sin a(\varkappa - \xi_1) + \sin 2a(\varkappa - \xi_1)]\left[(\varkappa - \xi_1)^2 - \left(\frac{\pi}{a}\right)^2\right]^{-1} \times \right.$$
$$\times (\varkappa - \xi_1) + [\sin a(\varkappa + \xi_1) + \sin 2a(\varkappa + \xi_1)]\left[(\varkappa + \xi_1)^2 - \left(\frac{\pi}{a}\right)^2\right]^{-1}(\varkappa + \xi_1) =$$
$$= a\varkappa^2(\cos 2a\xi_1 + \cos a\xi_1)\left[\xi_1^2 - \left(\frac{\pi}{a}\right)^2\right]^{-1}. \qquad (3)$$

where $\varkappa^2 = \xi_n^2 + \eta_n^2, \quad \eta_n = n\frac{\pi}{a}, \; n = 0, 1, 2, \ldots$

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The authors claim that experimental verification showed that the value of the critical frequency

computed from (3) agrees very well with experimental results. As far as the damping constant is concerned, it is well known that it can be obtained using the conditions of Leontovich using equation:

$$\alpha = \frac{R_s \int_l |H_{tg}|^2 \, dl}{2 \mathrm{Re} \int_{F_0} [EH^*]_z \, ds}, \quad \text{where} \quad R_s = \sqrt{\frac{\pi \mu f}{\sigma}}. \tag{4}$$

Expanding the magnetic field as a series of products of trigonometric functions and using the first (n = 0) approximation, the authors computed $\alpha$ for the case of a copper cross-shaped waveguide with $\sigma = 58 \cdot 10^7$ mho/m and a = b = d = h = 12.7 cm. The damping vs. wavelength curve is plotted as curve 1 on Fig. 3. The critical wavelength in this case was 42 mm. For comparison the same figure contains curve 2 which represents the damping constant for $H_{01}$ in a circular copper

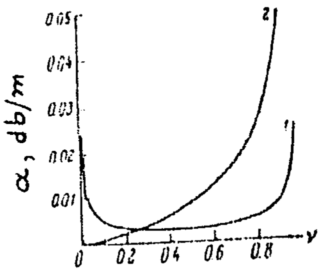


Fig. 3.

waveguide of 50-mm diam. Note the relative constancy of damping in a wide region of wavelengths in the case of the cross-shaped waveguide. Note also the possibility of working with larger values of the $\lambda_o/\lambda_c$ ratio. To check on the problem of satellites the authors calculated the critical wavelength of the wave whose field is represented

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on Fig. 4. The computations were performed in the standard way using rectangular regions I and II of the waveguide. For the waveguide dimensions mentioned earlier, the critical wavelength came out to be 36.8 mm. This shows that there exists the possibility of propagation with low energy loss of quasi-circular waves in a cross-shaped waveguide without any satellite. There are 4 figures; and 7 Soviet references.

ASSOCIATION: Khar'kov State University imeni A. M. Gor'kiy (Khar'kovskiy gosudarstvennyy universitet imeni A. M. Gor'kogo)

SUBMITTED: July 29, 1959

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Propagation of a Quasi-Circular Electrical Wave in a Cross-Shaped Waveguide

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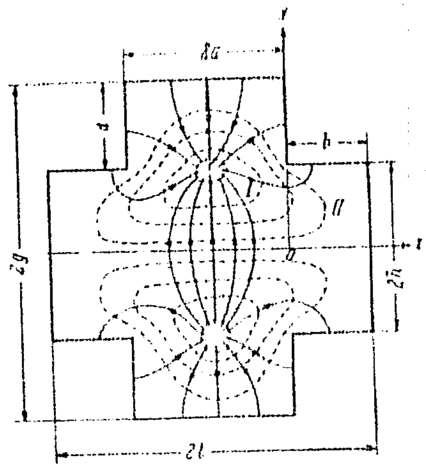


Fig. 4.

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S/058/63/000/002/061/070
A160/A101

AUTHOR: Zorkin, A. F.

TITLE: Dispersion equations for uniformly bent waveguides of a complex cross-section shape with lugs on the cylindrical walls

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1963, 25, abstract 2Zh155 ("Uch. zap. Khar'kovsk. un-t", 1962, v. 121, Tr. Radiofiz. fak., 5, 56 - 73)

TEXT: Dispersion equations were obtained for uniformly bent H, Π, T and cross-shaped waveguides by solving Maxwell's equations. These equations permit to find the azimuthal propagation constant as a function of frequency for any geometrical dimensions of the bend. Characteristic equations for calculating the critical frequencies are obtained as a particular case of the dispersion equations. When deriving the dispersion equations, the conditions for the agreement of the solutions at the division boundaries were obtained from the condition of equality of the exchange energy currents between the adjacent regions at each point of the separation surface. An experimental checking revealed that

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the calculated critical frequencies adequately well coincided with the measured ones.

[Abstracter's note: Complete translation]

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S/058/63/000/002/062/070
A160/A101

AUTHORS: Zorkin, A. F., Tereshchenko, A. I., Vakhraneva, L. F.

TITLE: Dispersion equations for uniformly bent waveguides of a complex cross-section shape with lugs on the plane wall sides

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1963, 25, abstract 2Zh156 ("Uch. zap. Khar'kovsk. un-t", 1962, v. 121, Tr. Radiofiz. fak. 5, 74 - 83)

TEXT: On the basis of the solution of Maxwell's equations, dispersion equations were obtained for uniformly bent H, Π, T and cross-shaped waveguides with lugs on the plane walls of the bend. The characteristic equations for determining the critical frequencies were obtained as a particular case of dispersion equations. The obtained equations are true for any bend radii. The calculations of the critical frequencies were experimentally checked. The checking confirmed the correctness of the theoretical conclusions.

[Abstracter's note: Complete translation]

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SEDYKH, V.M.; ZORKIN, A.F.

Propagation of a quasi-circular electric wave in an H-shaped wave guide. Zhur.tekh.fiz. 30 no.2:159-164 F '60. (MIRA 14:8)

1. Khar'kovskiy gosudarstvennyy universitet im. A.M.Gor'kogo.
(Electric waves) (Wave guides)

AM4033664 BOOK EXPLOITATION S/

Shubarin, YUriy Vasil'yevich; Zorkin, Anatoliy Fedorovich

Super-high frequency antenna measurements; antenna handbook (Antenny*ye izmereniya na sverkhvy*sokikh chastotakh; antenny*y praktikum) Kharkov, Izd-vo KhGU, 62. 0170 p. illus., biblio., fold. diagrs. Errata slip inserted. 5,000 copies printed. Textbook for students of radio departments at universities in the Ukrainian S.S.R.

TOPIC TAGS: microwave antenna, microwave antenna measurements, microwave antenna laboratory practice, microwave radiation measurement apparatus, director antenna, mirror antenna, lens antenna, slot antenna, surface wave antenna, polarized antenna, directivity pattern, aperture, slotted line, attenuator, amplifier, signal generator

PURPOSE AND COVERAGE: The book is the second part of a text on microwave antennas and contains procedures for antenna measurements at microwave frequencies, a brief description of standard apparatus which can be used for the measurements, and also for practical laboratory antenna work. It is intended for students in radio departments of secondary and higher technical schools, and can also be used by engineering-technical personnel working in antenna fields. The measurement procedures are written from a unified point of view. Chs. 1 and 2 were written by Yu. V.

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Shubarin, and Ch. 3 by A. F. Zorkin. The authors are grateful to the staff of the Microwave Physics Department of the Khar'kov State University for a discussion of the manuscript, and also to the reviewers, docent Yu. A. Mishchenko and docent Ya. S. Shifrin for variable hints, to docent A. I. Tereshchenko for editing the manuscript, and to T. N. Anishchenko for styling the manuscript.

TABLE OF CONTENTS [abridged]:



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OTHER: 006 DATE ACQ: 25Jun64

Card 2/2

SEDYKH, V.M.; ZORKIN, A.F.; DMITRIYEV, V.M.; LYAPUNOV, N.V.; YATSUK, L.P.

Parameters of H-shaped waveguides in the millimeter and centimeter range. Zhur. tekh. fiz. 31 no.6:699-703 Je '61. (MIRA 14:7)

1. Khar'kovskiy gosudarstvennyy universitet imeni A.M. Gor'kogo.
(Wave guides) (Microwaves)

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R002065430002-9"

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R002065430002-9"

SEDYKH, V.M.; ZORKIN, A.F.

Wave guide with a cross-shaped transverse section. Izv.vys.ucheb. zav.; radiofiz. 3 no.2:269-275 '60. (MIRA 13:7)

1. Khar'kovskiy gosudarstvennyy universitet.
(Wave guides)

SHUBARIN, Yuriy Vasil'yevich; ZORKIN, Anatoliy Fedorovich; TERESHCHENKO, A.I., kand. fiz.-matem. nauk, otv. red.; KOVALEVA, Z.G., red.; TROFIMENKO, A.S., tekhn. red.

[Antenna measurements at superhigh frequencies] Antennye izmereniia na sverkhvysokikh chastotakh; antennyi praktikum. Khar'kov, Izd-vo Khar'kovskogo univ., 1962. 170 p. (MIRA 16:12)

(Antennas (Electronics)) (Radio measurements)

S/141/60/003/02/011/025
E192/E382

AUTHORS: Sedykh, V.M. and Zorkin, A.F.

TITLE: Waveguide Having a Cruciform Cross-section

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1960, Vol 3, Nr 2, pp 269 - 275 (USSR)

ABSTRACT: The waveguide considered is illustrated in Figure 1. First, the propagation of the $H_{10}$-wave is considered. The problem is equivalent to finding the solution of:

$$\partial^2 H/\partial x^2 + \partial^2 H/\partial y^2 + k^2 H = 0 \quad (1)$$

where $H = H_z = H(x,y)$ is the longitudinal component of the magnetic field,

$k = 2\pi/\lambda_c$ and

$\lambda_c$ is the critical wavelength for the waveguide. All the remaining magnetic-field components can be expressed in terms of $H_z$. For the purpose of analysis, the waveguide of Figure 1 is divided into two rectangular regions, I and II. For the region II the magnetic

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field is given by Eq (4), while in the second region it is expressed by Eq (5). At the boundaries of the two regions the equations should satisfy the continuity conditions expressed by Eqs (6). The coefficients defined by Eqs (7) and (8) are now introduced. From the conditions of Eqs (6) it follows that the relationships between M and N, and Q and R are defined by Eqs (9) and (10). The coefficient $M_o$ can be evaluated from Eq (11), while the coefficients $M_n$ are given by Eq (13). Similarly $R_0$ and $R_m$ are determined by Eqs (14) and (15). From the above it is seen that all the coefficients $M_n$ can be expressed in terms of $N_m$ if there exists an infinite system of infinite homogeneous equations whose determinant $\Delta = 0$. The minimum root of the characteristic equation $\Delta = 0$ will correspond to the $H_{10}$-wave. The first-approximation results in the following expression for k :

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S/141/60/003/02/011/025
E192/E382

Waveguide Having a Cruciform Cross-section

$$\operatorname{ctg}(bk) - \frac{h}{g}\left\{\operatorname{tg}(ak) + 2k\sum_{n=1}^{\infty}\frac{\operatorname{tg}(ap_n)}{p_n}\left[\frac{\sin(s_n h)}{s_n h}\right]^2\right\} = 0 \quad (16).$$

For the region I this can be written as Eq (17). In the case of the $H_{20}$-wave, the fields in the two regions are expressed by Eqs (18) and (19). By applying the method indicated above, it is found that the formula for determining k is in this case given by Eq (20). Eqs (17) and (20) were employed to plot the graphs illustrating the dependence of the critical wavelengths on the parameter a (Figure 1) for the waves $H_{10}$, $H_{01}$ and $H_{20}$ for d = 4, 5 and 6 mm; the graphs are shown in Figure 2. The dependence of the critical wavelength on d for constant a is illustrated in Figure 3. For the case of the $H_{11}$-wave the boundary conditions are expressed by Eq (21) on the contour FAB and by Eq (22) on the contour BCDEF (Figure 1).

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Waveguide Having a Cruciform Cross-section

S/141/60/003/02/011/025
E192/E382



The fields in the two regions are now expressed by Eqs (23) and (24). The expression for the wave number k is given by Eq (25). For the first region this can be written as Eq (26). From this it is seen that the equation has no solutions in this region. For the second region, Eq (25) can be written as Eq (27). This is valid for determining the critical wavelength. The evaluation of the maximum permissible power for the cruciform waveguide operating with the $H_{10}$-wave can be done by employing the method suggested by H. Barlow (Ref 6). By this method it is found that for the waveguide with $2\ell = 23$ mm, $2h = 10$ mm, $2a = 10.2$ mm and $d = 4.56$ mm the maximum permissible power is 1 100 kW.
There are 3 figures and 6 references, 2 of which are English and 4 Soviet.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet (Khar'kov State University)

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VC

23725

S/057/61/031/006/009/019
B116/B203

9,1300

AUTHORS: Sedykh, V. M., Zorkin, A. F., Dmitriyev, V. M., Lyapunov, N.V., and Yatsuk, L. P.

TITLE: Parameters of H-shaped waveguides in millimeter and centimeter wave bands

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 699-703

TEXT: The authors divide the papers theoretically determining the parameters of H-shaped waveguides into two groups: (1) papers by foreign authors: S. Cohn (Ref. 1: Proc. IRE, 35, 783-788, August, 1947), K. Tomiyasu, L. Swern (Ref. 2: Proc. Nat. Electr. Conf., 10, 76-82, 1954), S. Hopfer (Ref. 3: Trans. IRE, MMT-3, no. 3, 1955), using the method of equivalent schemes; (2) papers by L. N. Deryugin (Ref. 4: Radiotekhnika, no. 6, 1948), A. Ya. Yashkin (Ref. 5: Uch. zap. MGPI imeni Lenina, 101, 1957), N. F. Funtova (Ref. 6: Uch. zap. MGPI imeni V. I. Lenina, 88, 1954), using the more accurate electrodynamic method of determining the eigenvalue (critical frequency) of the H-shaped waveguide (working on the basic wave $H_{10}$). The authors of the present paper calculated the main parameters

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of H-shaped waveguides: the critical frequency, the damping constant, the peak power, and the characteristic resistance, from a uniform standpoint, on the basis of the solution of the field equations. They present the scheme of calculation, the final formulas for calculating the parameters of H-shaped waveguides, and numerical data of these parameters for some H-shaped waveguides developed and tested at the Khar'kovskiy universitet (Khar'kov University). When determining the critical frequency (the eigenvalue) $\varkappa$, they only study the two ranges I and II (Fig. 1), and obtain

$$\frac{\operatorname{tg} \varkappa a}{\varkappa} = \frac{g \operatorname{ctg} \varkappa b}{\varkappa h} + \frac{2}{gh} \sum_{n=1}^{\infty} \frac{\operatorname{ctg} s_n b}{s_n} \frac{\sin^2 p_n g}{p_n^2}. \qquad (6)$$

for the calculation of $\varkappa$ in first approximation. $p_n = \frac{\pi}{h}$; $\varkappa^2 = p_n^2 + s_n^2$; $n = 0, 1, 2\ldots$ In a similar way, they obtain the formula

$$\frac{\operatorname{ctg} \varkappa a}{\varkappa} + \frac{g \operatorname{ctg} \varkappa b}{\varkappa h} = \frac{2}{gh} \sum_{n=1}^{\infty} \frac{\sin^2 s_n g}{s_n^2} \frac{\operatorname{ctg} p_n b}{p_n}, \qquad (7)$$

for an $H_{20}$ wave. $s_n = \frac{\pi}{h} n$; $s_n^2 + p_n^2 = \varkappa^2$; $n = 0, 1, 2, \ldots$ In practice, the $H_{20}$ wave is the wave nearest to the basic wave (and

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therefore the most dangerous one) for the dimensions of the cross section of H-shaped waveguides. Thus, the pass-band of the H-shaped waveguide is obtained by determining the critical frequencies of the waves $H_{10}$ and $H_{20}$ from (6) and (7). The other parameters of an H-shaped waveguide had been calculated in a paper by V. M. Sedykh (Ref. 7: Izv. vyssh. uchebn. zaved. MVO SSSR, Radiotekhnika, no. 3, 1959). Further studies, however, showed that more accurate results nearly equal to the test results were obtained by using the formula

$$W_{\text{т.}} = \frac{1}{2}\,\mathrm{Re}\int_S [\mathbf{EH}^*]\,ds. \qquad (8)$$

for determining the power transmitted by a waveguide of complicated cross section. In this case, the damping constant $\alpha$ at frequencies higher than the critical one can be determined from

$$\alpha = \frac{1}{2}\,\frac{R_s \int_l |H_l|^2\,dl}{\mathrm{Re}\int_s [\mathbf{EH}^*]\,ds}. \qquad (9)$$

where $R_s = \sqrt{\frac{\pi f \mu}{\sigma}}$. For an H-shaped waveguide,

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$$\alpha = \frac{R_s\left[\left(\frac{f_c}{f}\right)^2 V + U\right]}{T\sqrt{1-\left(\frac{f_c}{f}\right)^2}}. \qquad (10)$$

is written down, where $V = \frac{g^2}{h^2}\frac{\cos^2 \varkappa a}{\sin^2 \varkappa b}\left[\frac{\sin 2\varkappa b}{\varkappa} + 2(h + d\cos^2 \varkappa b)\right] - \frac{\sin 2\varkappa a}{\varkappa}$,

$$U = a + \frac{\sin 2\varkappa a}{2\varkappa} + \frac{g^2\cos^2 \varkappa a}{h^2 \sin^2 \varkappa b}\left(b - \frac{\sin 2\varkappa b}{2\varkappa}\right),$$

$$T = 240\pi g\left[a + \frac{\sin 2\varkappa a}{2\varkappa} + \frac{g}{h}\frac{\cos^2 \varkappa a}{\sin^2 \varkappa b}\left(b - \frac{\sin 2\varkappa b}{2\varkappa}\right)\right].$$

For the peak power of the waveguide, $W_{\tau_1} = \frac{E^2}{2\tau_1} T\sqrt{1-\left(\frac{f_c}{f}\right)^2} = W_{\tau_1\infty}\sqrt{1-\left(\frac{f_c}{f}\right)^2}$. (12) is obtained, where $\hat{W}_{t\infty} = \frac{E^2T}{2\tau_1}$ is the peak power at an infinitely high frequency, and $\tau_1 = \sqrt{\mu_1/\varepsilon_1}$. In analogy to the rectangular waveguide, the characteristic resistance Z is calculated from $Z = v_{eff}^2/W_t$ (13), where $v_{eff}$ is the maximum effective voltage between the steps and $W_t$ is the transmitted power. From (12) and (13), the authors obtain

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Parameters of H-shaped waveguides ...

$$Z = \frac{Z_{\infty}}{\sqrt{1 - \frac{f_c}{f}^{2}}} \qquad (14)$$

for the H-shaped waveguide, where $Z_{\infty} = \frac{4\varepsilon^2 r^2}{T}$ is the characteristic resistance of the H-shaped waveguide at an infinitely high frequency ($f = \infty$). From formulas (6), (7), (10), (12), and (14), they compute the parameters for six H-shaped waveguides, and plot the curves $\alpha(f)$. There are 4 figures, 2 tables, and 9 references: 5 Soviet-bloc and 4 non-Soviet-bloc.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A.M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: July 11, 1960

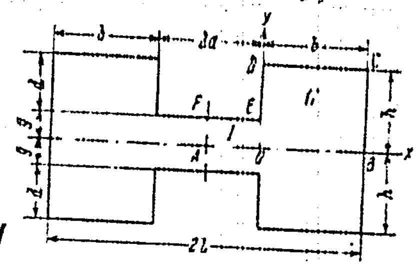

Fig.1

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ACCESSION NR: AR4034488 S/0058/64/000/003/H021/H021

SOURCE: Ref. zh. Fiz., Abs. 3Zh146

AUTHORS: Sedy'kh, V. M.; Zorkin, A. F.

TITLE: $E_{11}$ modes in cruciform waveguide

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962, Tr. Radiofiz. fak., v. 7, 101-105

TOPIC TAGS: cruciform waveguide, critical wavelength, wave propagation, cruciform symmetrical waveguide, $E_{11}$ mode

TRANSLATION: The conditions are explained under which a type $E_{11}$ mode will propagate in a cruciform symmetrical waveguide. The wave equation relative to the longitudinal component of the electric field $E_z$ is solved by the method of partial regions and by making the

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ACCESSION NR: AR4034488

fields continuous on their boundaries. The calculated dependence of the critical wavelength $\lambda_{cr}$ on the cross section dimensions is plotted. It is shown that $\lambda_{cr}$ increases monotonically with increasing width or height of the transverse region of the cruciform section. Comparison of the calculated values with the experimental ones shows that the formula obtained is suitable for practical calculations of $\lambda_{cr}$ of the $E_{11}$ mode. M. Aref'yev.

DATE ACQ: 10Apr64 SUB CODE: GE, SD ENCL: 00

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S/0058/64/000/003/H021/H021

ACCESSION NR: AR4034487

SOURCE: Ref. zh. Fiz., Abs. 3Zh145

AUTHORS: Sedy*kh, V. M.; Zorkin, A. F.

TITLE: Limiting power and characteristic resistance of cruciform waveguide

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962, Tr. Radiofiz. fak., v. 7, 96-100

TOPIC TAGS: Cruciform waveguide, limiting power, characteristic resistance, electric breakdown, electric strength, $H_{10}$ mode

TRANSLATION: Calculation of the limiting power of a cruciform waveguide (CW) or the fundamental $H_{10}$ mode is carried out by the Barlow method (Barlow, H. Proc. IRE, 1952, 99, No. 57, Part III). It is shown that breakdown in the central region (I) of the CW occurs at a transmitted power $\hat{P}_I = \hat{E}^2 S/K_z$, while breakdown in the region of the right angle (II) will occur at a transmitted power $\hat{P}_{II} = \hat{E}^2 C_1/K_z$. $\sin^2 bx$, where E — limiting value of the electric field at which breakdown occurs,

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S and $C_1$ are functions of the geometrical dimensions of the CW cross section, $K_z$ is the longitudinal wave resistance of the CW, b is the distance from the side wall to the boundary of the transverse region of the CW, and $\kappa$ is the eigenvalue of the CW (RZhFiz, 1961, 2Zh361). The breakdown region is determined by the ratio of the cross-section dimensions. It is shown that the CW has a larger electric strength than the corresponding rectangular waveguide. The characteristic resistance of the CW is $K = 2g^2 \cdot K_z/S$ (g -- height of the waveguide) and is obtained by transforming the ratio of the effective voltage between the upper and lower walls of the central region of the CW to the power transmitted to the waveguide cross section, averaged over the cycle. The characteristic resistance of the CW exceeds the characteristic resistance of the corresponding rectangular waveguide. M. Aref'yev.

DATE ACQ: 10Apr64 SUB CODE: GE, SD ENCL: 00

Card 2/2

ACCESSION NR: AR4023753 S/0274/64/000/001/A057/A057

SOURCE: RZh. Radiotekhnika i elektrosvyaz', Abs. 1A360

AUTHOR: Zorkin, A. F.

TITLE: Fields in H-shaped and cruciform uniformly bent waveguides

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 127, 1962, Tr. Radiofiz. fak., v. 6, 56-64

TOPIC TAGS: waveguide, waveguide wave propagation, field in waveguide, h shaped waveguide, cruciform waveguide, uniformly bent waveguide, potential function, field configuration

TRANSLATION: Wave propagation in H-shaped and cruciform waveguides which are uniformly bent in the H and E plane is investigated theoretically. Expressions are obtained for the potential functions of these waveguides, and substitution of these functions in the

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ACCESSION NR: AR4023753

wave equation yields a second-order differential equation. The latter is solved by the partial-region method, namely, by breaking down the waveguide transverse cross section into three rectangular regions, for each of which the differential equation is solved by separation of variables. The final dispersion equation is solved approximately. From the general expressions obtained for the fields in the investigated waveguides it is possible to determine the field configuration in the transverse cross section of the waveguide and the distribution of the field along the angle axis $\varphi$. The results obtained are valid also for Π-shaped and T-shaped waveguides. Bibliography, 5 titles. N. B.

DATE ACQ: 03Mar64 SUB CODE: GE, CO ENCL: 00

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ACCESSION NR: AR4023754 S/0274/64/000/001/A057/A057

SOURCE: RZh. Radiotekhnika i elektrosvyaz', abs. 1A361

AUTHOR: Zorkin, A. F.

TITLE: Bend of H-shaped and cruciform waveguides in the H plane

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 127, 1962, Tr. Radiofiz. fak., v. 6, 65-70

TOPIC TAGS: waveguide, bent waveguide, bent waveguide junction, h shaped waveguide, cruciform waveguide, generation of higher modes, reflection in waveguide junction

TRANSLATION: Expressions are obtained for the modulus and phase of the reflection coefficient of a uniform bend of an H-shaped or cruciform waveguide coupled to two semi-infinite straight waveguides. The formulas are obtained for the case when only the fundamental

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ACCESSION NR: AR4023754

mode propagates along the straight and bent waveguides ($H_1$ in the straight waveguide and $E_1$ in the uniformly bent one). At the junction of the straight and bent waveguides the incident wave is partially reflected and partially transmitted through the bent waveguide. Higher-modes arise near the junction. The amplitudes of the reflected waves are determined from the expressions for the fields in the uniformly bent H-shaped and cruciform waveguides (see Abstract 1A360) under the condition that the transverse components of the electric and magnetic fields must be continuous in the junction planes. The formulas obtained are valid also for H-shaped and T-shaped waveguides. Bibliography, 5 titles. M. B.

DATE ACQ: 03Mar64 SUB CODE: GE, CO ENCL: 00

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ACCESSION NR: AR4023755 S/0274/64/000/001/A057/A057

SOURCE: RZh. Radiotekhnika i elektrosvyaz', Abs. 1A362

AUTHORS: Sedy*kh, V. M.; Zorkin, A. F.

TITLE: Limiting power and characteristic resistance of cruciform waveguide

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962, Tr. Radiofiz. fak., v. 7, 96-100

TOPIC TAGS: waveguide, cruciform waveguide, limiting power, maximum power rating, characteristic resistance, wave resistance

TRANSLATION: The calculation of the limit of the $H_{10}$ mode power begins with the breakdown field intensity. The cruciform waveguide is divided into regions of two types; expressions for the transverse components of the electric and magnetic field intensities in terms

ACCESSION NR: AR4023755

of the longitudinal components and for the limiting power are obtained for each region. The limiting power for cruciform waveguides of two types is calculated for a frequency of 10 Gc and is found to be larger than for the corresponding rectangular waveguide. A plot of the breakdown power and of the wave resistance against frequency is presented. Bibliography, 4 titles. V. N.

DATE ACQ: 03Mar64 SUB CODE: GE, CO ENCL: 00

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ACCESSION NR: AR4023756 S/0274/64/000/001/A057/A057

SOURCE: RZh. Radiotekhnika i elektrosvyaz', Abs. 1A363

AUTHOR: Sedy*kh, V. M.; Zorkin, A. F.

TITLE: $E_{11}$ modes in a cruciform waveguide

CITED SOURCE: Uch. zap. Khar'kovsk. un-t, v. 132, 1962, Tr. Radio-fiz. fak., v. 7, 101-105

TOPIC TAGS: waveguide, cruciform waveguide, longitudinal electric field, critical wavelength, cutoff wavelength, cruciform resonator, $E_{11}$ mode

TRANSLATION: Conditions under which an $E_{11}$ mode can propagate in a cruciform waveguide are investigated; the $E_{11}$ mode critical frequency is calculated as a function of the transverse waveguide dimensions.

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ACCESSION NR: AR4023756

Waves with longitudinal electric field components can be used in devices operating on the principle of interaction between an electron beam and the field. A characteristic equation is derived and solved approximately. Plots of $\lambda_{cr}$ against the dimensions of the waveguide projections are constructed. The critical wavelength increases monotonically with increasing height and width of the projections of the cruciform waveguide. An experimental determination of $\lambda_{cr}$ in a cruciform resonator, excited by a post located along the waveguide axis perpendicular to the transverse cross section plane, has confirmed the correctness of the calculations. Bibliography, 2 titles. N. B.

DATE ACQ: 03Mar64 SUB CODE: GE, CO ENCL: 00

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600

1. SHLEZINGER, N.A.; ZORKIN, F.P.

2. USSR (600)

"Experimental Proof of the Thermodynamic Theory of Mixed Crystals," Zhur. Fiz. Khim., 13, No 10, 1939. Chair of Physical and Colloidal Chemistry. Received 5 May 1939.

9. [redacted] Report U-1615, 3 Jan. 1952

PROCESSES AND PROPERTIES INDEX

BC

**Distribution of bromine between crystals and solutions of potassium chloride and bromide.** N. A. SCHLEZINGER, E. P. ZORKIN, and L. N. NOVOSHENOVA (J. Appl. Chem. Russ., 1938, 11, 1250—1265).—The ratio $x/N$, where $x$ and $N$ = [KBr]/([KBr] + [KCl]), for aq. KCl-KBr and the crystals separating therefrom, respectively, falls with rising temp. and [KBr], and may be > or <1. The existence of solutions in which [Cl]/[Br] remains const. during crystallisation is postulated; such solutions would be analogues of liquid azeotropic mixtures.

R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Determination of bromide ion in presence of large quantities of chloride ion. E. P. Z[illegible] (J. Appl. Chem. Russ., 1934, 7, 852—855).—[illegible]'s method (A., 1931, 811) is preferred. R. T.

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION

**The conditions of origin of kainite.** N. A. Shlezinger, F. P. Zorkin and E. V. Petukhova. *Compt. rend. acad. sci. U.R.S.S.* **27**, 406-9(1940)(in German). The systems $KCl$-$MgSO_4$-$H_2O$ and $KCl$-$NaCl$-$MgSO_4$-$H_2O$ were investigated at 35° and at 55°. Diagrams were made including also the work of Kurnakov and Shoikhet (*C. A.* **32**, 3247[a]) and van't Hoff, resp., for the two systems at 25°. The field of stability is expanded at higher temps. At 55°, soln. and 5 solid phases (kainite, leonite, langbeinite, sylvite and halite) are coexistent. Kainite was prepd. by the reaction of carnallite with kieserite, sylvite and water at 55°. D. W. Pearce

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Ca

8

**The chemical composition of the Ozinka district (Eastern Saratov region) salts and the possibility of their industrial utilization.** N. A. Shlezinger, E. P. Zotkin and A. P. Larina. *Uchenye Zapiski Saratov. Gosudarst. Univ. N. G. Chernyshevskogo* 15, No. 1 (Miscellaneous), 175-88 (1940).—A no. of facts support the conclusion that the Ozinka district salt deposits are mostly of a secondary origin. Cores of fissure No. 1 consist of halite, sylvite, carnallite, kieserite, polyhalite and anhydrite. Fissure No. 2 contained also bischofite. Fissure No. 1 can be divided into 3 distinct zones. (a) The upper polyhalite zone (292-312 m.) contains no carnallite, but contains from traces to 15.98% of polyhalite. (b) The carnallite zone (312-92 m.) contains carnallite from traces to 31.98%; polyhalite is found only in exceptional cases, the content of kieserite varies from 0 to 21.98% and at the boundary of the kieserite its content reaches up to 76.06%. (c) The lower polyhalite zone contains no carnallite, contains polyhalite in amts. varying from 0 to 14.38% and is rich in halite (not less than 16.38%, but ordinarily approx. 80.00% and more). The content of Br in fissure No. 1 is 0.011-0.063%. It is slightly higher in zones rich in KCl and $MgCl_2$. Fissure No. 2 presents an entirely different picture. It contains little polyhalite (not more than 1.26%) and carnallite (approx. 18% at a depth of 402.3 m. and 22% at a depth of 250.1 m., but usually not over 10%), and the amt. of kieserite does not exceed 31.0% (usually considerably less). It contains 2 layers of bischofite at depths of 251-60 m. and 364.0-392.78 m. in amts. of 30.00-75.00%. The av. ratio Br:Cl for samples from the carnallite zone which contains no other chlorides except NaCl is $1.86 \times 10^{-3}$. Seventeen references.

W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

2

Ca

**Experimental verification of the thermodynamic theory of solid solutions.** N. A. Shleslinger and F. P. Tovkin. *J. Phys. Chem.* (U. S. S. R.) 13, 1802-8(1939).—The ds. and the compns. of the solid and liquid phases of solid KBr + KCl in equil. with a satd. soln. of KCl + KBr at 35° were measured for various ratios of KBr to KCl. From these data the activity coeffs. of KCl and KBr in the crystal lattices of the mixed crystals were calcd.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Determination of bromide in the presence of large amounts of chloride. F. P. Zuskin. *J. Applied Chem. (U. S. S. R.)* 7, 852-6(1934).—A review of various methods is presented and it is stated that the method of van der Meulen (*C. A.* 25, 1757) gives the most accurate results. Twelve references. A. A. Bochtlingk

Be

**Sensitive reaction for boric acid.** V. P. Zhukov. (J. Appl. Chem. Russ., 1936, 9, 1505—1506).—A drop of the feebly alkaline solution is evaporated to dryness in a crucible, and a drop of 0·05% carmine in conc. $H_2SO_4$ is added; the colour changes from red to blue in presence of <$10^{-6}$ g. of B. R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Experimental verification of the thermodynamic theory of solid solutions. N. A. Shlezinger and F. P. Zorkin. J. Phys. Chem. (U. S. S. R.) 13, 1502-6(1939).—The di. and the compns. of the solid and liquid phases of solid KBr + KCl in equil. with a satd. soln. of KCl + KBr at 35° were measured for various ratios of KBr to KCl. From these data the activity coeffs. of KCl and KBr in the crystal lattices of the mixed crystals were calcd.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

CR

2

The distribution of bromide between the crystals and solution of potassium chloride and bromide. N. A. Shlezinger, F. P. Zorkin and L. V. Novoselova. J. Applied Chem. (U. S. S. R.) 11, 1250-63(in English, 1263)(1938).—The aq. soln. of KCl and KBr mixt. was evapd at 0° and at 35° and the distribution of KBr between the solid and the liquid phase was measured. The distribution coeff. (the ratio of KBr concn. in the soln. to that in the crystals) diminished with increase in the KBr concn. at both temps. but it was greater at 35° than at 0°. Since the distribution coeff. was larger than unity for a small concn. of KBr (about 1.3 at 0° and 1.5 about 35°) and smaller than unity for a larger concn., there must be solns. from which the crystals could be pptd. with the same content of KBr as in the soln. (approx. 3% at 0° and 12.5% at 35°). The ratio of mol. fraction of KBr in the soln. to that in the crystals diminished with increase in the KBr concn. from 6.83 to 0.86 at 35° and from 5.03 to 0.91 at 0°. Therefore, there must be a soln. in which the ratio of chloride to bromide is not affected by evapn. Such solns. resemble in that respect azeotropic mixts. of two liquids. Data are tabulated.

A. A. Podgorny

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

LUK'YANOV, V.I.; KHORKHOT, A.Ya.; ZORKIN, G.N.; NORMANN, B.B.; PLESHKOV, L.Ye.; LYTKIN, K.F.; KOZHEVNIKOV, O.A.; TEMCHIN, N.A.; ORLOV, V.V.; ZLATOLINSKIY, V.N.; MAKHOV, M.S.; RUKAVISHNIKOV, I.D.; SHITOVA, L.N., red.izd-va; OSENKO, L.M., tekhn.red.

[Instructions for drafting general plans of industrial enterprises] Ukazaniia po proektirovaniiu general'nykh planov promyshlennykh predpriiatii. Odobreny Gosudarstvennym komitetom Soveta Ministrov SSSR po delam stroitel'stva 15 noiabria 1960 g. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1961. 131 p. (MIRA 15:2)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut gradostroitel'stva i rayonnoy planirovki. 2. Akademiya stroitel'stva i arkhitektury SSSR, Nauchno-issledovatel'skiy institut gradostroitel'stva i rayonnoy planirovki (for Luk'yanov). 3. Akademiya stroitel'stva i arkhitektury USSR, Nauchno-issledovatel'skiy institut gradostroitel'stva (for Khorkhot). 4. Giproaviaprom (for Zorkin, Normann). 5. Gosudarstvennyy soyuznyy institut po proyektirovaniyu metallurgicheskikh zavodov (for Pleshkov). 6. Gosudarstvennyy institut po proyektirovaniyu zavodov tyazhelogo mashinostroyeniya (for Lytkin, Kozhevnikov). 7. Gosudarstvennyy proyektnyy institut No.1 (for Temchin). 8. Gosudarstvennyy proyektnyy institut stroitel'noy promyshlennosti (for Orlov, Zlatolinskiy). 9. Gosudarstvennyy proyektnyy institut po promyshlennomu transportu (for Makhov, Rukavishnikov).

(Industrial plants—Design and construction)

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